

BOARD OF COUNTY COMMISSIONERS

Budget Discussion Item

Date of Meeting: July 23, 2002
Date Submitted: July 16, 2002

TO: Honorable Chairman and Members of the Board

FROM: Parwez Alam, County Administrator
Kim Dressel, Management Services Director

SUBJECT: NCGI/Mainline's July 8, 2002 Proposal for Digital Canopy Expansion to
Killearn Lakes Area

STATEMENT OF ISSUE: NCGI/Mainline has submitted a proposal for a pilot project to provide wireless high-speed Internet service to the Killearn Lakes area for the Board's consideration. The proposed NCGI contract is for \$48,000 and the total pilot project cost is estimated at \$110,400 (including NCGI's contract).

BACKGROUND: Staff was requested to present the subject proposal to the Board as a budget discussion item. The proposal is for the County to enter into a \$48,000 agreement with NCGI for a pilot project to provide a wireless network for five residents within the Killearn Lakes Plantation neighborhood. According to the proposal, the Killearn Lakes area of Tallahassee currently has no options for high-speed Internet access, as neither DSL nor Cable is currently available in the area. Staff provides the following overview of high-speed internet access to help frame the issue:

What is High Speed Internet Access? – High-speed transmission services (“broadband”) is a high-capacity communications pipeline capable of delivering simultaneously a range of voice, video and data services to the home in a truly interactive reliable manner. It allows users to access the Internet and Internet-related services at significantly higher speeds than traditional modems. The Federal Communications Commission (FCC) defines “high-speed” as “...delivering transmissions to the subscriber at a speed in excess of 200 kbps in at least one direction.”

What Types of High Speed Internet Access are Available and Used? – Some of the most common methods residential and small business customers use include:

1. **Cable Modem:** Originally meant to deliver television into homes, cable technology is now being used for high-speed Internet.

...including phone up date w/ FCC size

Budget Discussion Item: Proposal for Digital Canopy Expansion to Killlearn Lakes Area
July 23, 2002
Page 2

2. **ADSL (Asymmetric Digital Subscriber Line):** Asymmetric Digital Subscriber Line (ADSL, or often referred as just DSL) is a high-speed broadband Internet service that is best suited for residential use. It is called "asymmetric" because more bandwidth is reserved for receiving data than for sending data, making ADSL an ideal solution for residential use.
 3. **Satellite:** Satellite service is wireless, and ideal for areas where cable and DSL services are not available. High-speed Internet access is provided through: (1) one way satellite communication (using a dial-up modem with a satellite dish); or (2) two way satellite communication (a dial-up modem is not used).
 4. **Wireless:** Wireless signals are transmitted from a broadcast tower to special antennas affixed to residences or businesses throughout a local market, so that customers in remote areas can be reached without the need for laying new cables. Special care is needed to site the base antenna and customer-site receivers to insure a minimum of outages. Wireless technology may use **licensed or unlicensed spectrum**. ~~Licensed means you are granted a license from the FCC to use a part of a protected spectrum that should provide interference-free operation.~~ While this is not always the case, it does provide legal recourse when compared to unlicensed bands. ~~Unlicensed service does not require a license, so the capital outlay can be much lower. FCC rules severely limit the range of unlicensed wireless.~~ In general, unlicensed providers cannot guarantee quality of service, since they do not own the frequencies they use. Licensed spectrum offers the promise of ~~regulated security, thereby reducing risk to the client; however, unlicensed broadband~~ wireless vendors can offer encryption, authentication, scrambling and physical security technology.
- A. **Wireless Cable (Multipoint Multichannel Distribution Services (MMDS))** -- MMDS was originally intended to provide video services known as wireless cable TV. It uses licensed spectrum that could be used for the cell system. Unlike a mobile device, the antenna can be accurately targeted for optimal reception. It provides a good alternative if DSL is not available due to excessive distance from the central office. MMDS technology supports n x 64 speeds ranging from 128kbps to 1.5 Mbps. Equipment includes a MMDS antenna, a digital cable modem and wiring; the filter and down-converter are miniaturized and built into the small end-user antenna.
 - B. **Fixed Wireless (Point to Multipoint Fixed Wireless)** -- Uses unlicensed band spectrum to provide Internet services from a fixed point to a fixed antenna (not a mobile solution).

FCC's High-Speed Services for Internet Access: Subscribership as of June 30, 2001 reports on the number of U. S. Residential and Small Business High-Speed lines (Table 1) (only entities with at least 250 high speed service lines, or wireless channels, in a given state need to report to the FCC; others may voluntarily report). Some ASDL and Integrated Services Digital Network

Budget Discussion Item: Proposal for Digital Canopy Expansion to Killlearn Lakes Area
July 23, 2002
Page 3

(ISDN) services provided by telephone companies and some services that connect subscribers to the Internet over cable systems do not meet this criterion, but may nevertheless meet the needs of the subscribers who select them. The report shows:

- Cable and telephone lines have brought high-speed Internet service to the vast majority of current residential and small business customers (a large portion of the network infrastructure was already in place to meet cable television and telephone subscriber needs).
- The rate of growth in Internet access via cable and telephone lines appears to have begun declining, while the rate of growth via satellite or fixed wireless technology appears to be increasing.

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Table 1 – National Statistics from FCC High-Speed Services for Internet Access: Subscribership as of June 30, 2001 Number of Residential and Small Business End-User Customer Lines (or Wireless Channels)							
	12/1999	6/2000	12/2000	6/2001	% 6/2001	% Change	
						6/2000 - 12/2000	12/2000 - 6/2001
ADSL	291,757	772,272	1,594,879	2,490,740	32%	107%	56%
Cable Modem	1,402,394	2,215,259	3,294,546	4,998,540	65%	49%	52%
Satellite/Fixed Wireless	50,189	64,320	102,432	182,165	3%	59%	78%
Subtotal	1,744,340	3,051,851	4,991,857	7,671,445	100%	63%	51%
Fiber & **Other Wireline	47,879	111,815	178,514	140,930	*NM	*NM	*NM
Total Lines	1,792,219	3,163,666	5,170,371	7,812,375	*NM	*NM	*NM
*Not included in totals by FCC as inconsistencies in reporting data made it "not meaningful." **Symmetric DSL services at speeds exceeding 200 kbps are included in the "other wireline" category because they are typically used to provide data services that are functionally equivalent to a T1 and other data services that wireline telephone companies have offered to business customers for some time.							

get up date from FCC

Budget Discussion Item: Proposal for Digital Canopy Expansion to Killearn Lakes Area
July 23, 2002
Page 4

ANALYSIS:

Proposal: The proposed pilot project is summarized and discussed in the following section of this discussion item (based upon the proposal (Attachment #1) and discussion with NCGI staff). The responsibilities of the County and NCGI are summarized in Table #2:

A. Wireless Network: NCGI/Mainline would subcontract with CES Team One (a Pensacola-based firm that provides NCGI with radio frequency (RF) network design work and which is a Motorola reseller) to design a small wireless network in the Killearn Lakes Area. **The proposal is to utilize Motorola Canopy's wireless technology**, so there is no need to go through the existing phone or cable network. **Canopy operates in the unlicensed 5GHz U-NII band**, so there's no need for spectrum acquisition or site licensing. The network would include –

- (1) **A central collection point** on a cellular or other tower within the neighborhood. NCGI would try to identify a tower owner willing to donate or rent space to the project. NCGI could not provide an estimated cost for renting tower space (the Sheriff's office pays \$5,400/year to rent space on a radio tower).
- (2) **Five house-level access "subscriber units" located within a 2-mile radius of the central collection point** would be installed on home roofs at a cost of approximately \$500 each (including the cost of equipment and installation). The County could either absorb the cost of the units or educate citizens about the availability of this service and pass along the cost to the subscriber at a cost, according to the proposal, that is comparable to a DSL or Cable modem. ~~The proposal did not address removing equipment if the service were not continued beyond the pilot period.~~

B. The County would provide Broadband to the central collection point:

- (1) **Internet Service & Broadband Connection:** The cost to obtain and deliver Broadband from a location to be determined to the central collection point cannot be precisely estimated until the network is designed.
 - NCGI projected the cost, to obtain broadband from a site to be determined and then to provide broadband to the central collection point at the tower, would range between \$25,000 to \$75,000 during the pilot project (\$50,000 midpoint cost estimate).
 - After the pilot project, the County's recurring Broadband line cost is estimated at \$25,000/year (the cost may increase, depending upon customer utilization).
- (2) **Network Infrastructure:** During the pilot project, the system could be housed on existing County network infrastructure (with the exception of the authentication server/software). However, if continued/expanded, the County would need to purchase additional infrastructure.
- (3) **Authentication Server and Software:** Needed for security purposes with a cost

Budget Discussion Item: Proposal for Digital Canopy Expansion to Killearn Lakes Area
July 23, 2002
Page 5

estimated at \$7,000.

- **(4) Network/Server Support:** NCGI estimated the County's staffing impact, during the pilot project, to be 5 to 20 hours/week for network infrastructure (NCGI would be responsible for direct customer support during the pilot project). If the project were continued/expanded, there would be an additional staffing impact to the County (the impact cannot be defined based upon the information staff has available at this time).

C. Customer Support: During the pilot project, NCGI would provide customer connection to the system and would be the customer's point of contact. NCGI would troubleshoot Internet connectivity from the central collection point to the homes. If a performance issue does not appear to be between the central collection point and the home, then NCGI could contact the County to troubleshoot the system from the Internet connection up to the central collection point. Customer support would be available only during regular business hours (24 hours/day, 7 days/week support will not be available).

D. Time Period: The pilot project is estimated to last two months.

E. Contract Costs: The contract proposal total \$48,000; contract estimates follow:

- **NCGI/Mainline Project Management:**

Obtain tower and Coordinate bandwidth --	\$10,000
Coordinate tower build out, antenna installations, customer support --	10,000
Total Project Management	20,000

- **Equipment & Installation:**

Tower, Equipment	13,935
Tower, Equipment Installation	4,000
Tower Subtotal	17,935

Residential Units (5 @ \$617.30 each)	3,087
Residential Units, Installation (5 @ \$450 each)	4,400
Residential Units Subtotal	7,487

Total Equipment and Installation	25,422
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- **Network design (est. subcontract with *Pensacola-based Team One)** 2,578

(*will charge actual cost, not to exceed total)

- **Total Contract** **\$48,000**

Budget Discussion Item: Proposal for Digital Canopy Expansion to Killearn Lakes Area
July 23, 2002
Page 6

Table 2 – Pilot Project Responsibilities & *Est. Costs Summary			
Item	NCGI (in contract cost)	County	Pilot Cost Est.
Network:	Design, build and install the wireless network from a central collection point to 5 homes within a 2-mile radius (through a subcontract with CES Team One). (Installation costs to 5 homes included). Coordinate with the County for Broadband.	Provide Broadband and deliver it to the central collection point: Internet Service: \$25,000 to \$75,000 one-time (during pilot project – midpoint estimate @ \$50,000); \$25,000/year ongoing annual cost after pilot project. Network Infrastructure: Use existing for pilot project; purchase add'l. if pilot extended/expanded.	\$ 50,000
		Authentication Server/Software	7,000
Antenna Space:	Attempt to obtain donated antenna space	Antenna space if not donated, @ \$1,350/qtr. or \$5,400/year (est. based on Sheriff's cost for radio tower space). – est. cost for one quarter for the pilot	1,350
Support (business hours; not 24/7):	Customer point of contact; troubleshoot central collection point to home; contact County to troubleshoot from Internet to central collection point.	Network infrastructure support to NCGI (not directly with customers) est. at 5 - 20 hours/week.(additional impact if extended/expanded)	
Contract:			48,000
Total			\$106,350
*County costs may vary widely based upon network design & central collection antenna arrangements.			

What Technology is Available in the Killearn Lakes Area for Accessing the Internet? The proposal states that the Leon County Commission has expressed interest in exploring the ability of Wireless to extend coverage (high-speed Internet access) to the Killearn Lakes area neighborhood, as neither DSL nor cable are available there. As discussed previously in this item, there are four widely used technologies to receive broadband high-speed Internet access: (1) ADSL and related technologies over telephone lines; (2) television cable modems; (3) satellite; and (4) wireless – using licensed or unlicensed spectrum. In determining the potential unmet need/customer base for high-speed Internet access in the Killearn Lakes area, a consideration is the technology currently available for delivering Internet access there as well as the estimated cost for those services. Therefore, staff searched the Internet and contacted service providers to gauge current availability and cost.

- Time-Warner is the cable provider for most of the Killearn Lakes area, and it does not provide cable modem services in this service area.
- Sprint provides Internet service over telephone lines over much of Leon County, through local ISP partners. However, technical/equipment difficulties have delayed deployment in

Budget Discussion Item: Proposal for Digital Canopy Expansion to Killearn Lakes Area
 July 23, 2002
 Page 7

the Killearn Lakes area. Staff has been advised that Sprint continues its plans to deploy DSL service in a substantial portion of the Killearn and Killearn Lakes/Golden Eagle areas by the end of the calendar year continuing throughout 2003 (Attachment #6).

- Table 3 provides a summary of methods residential customers commonly use to access the Internet and whether that technology is available in the Killearn Lakes area. This data is based upon surveys of providers that staff was able to identify/contact prior to finalizing this discussion item for distribution.

Table 3 – Internet Access Option / Technology Available in Killearn Lakes Area (KLA)			
Method	*Speed	Approx. Cost (prices vary)	KLA Availability
Analog Modem	56 kbps dial-up access	\$14/mo., \$10 set-up, \$30 modem	Yes
ISDN (tele- phone lines)	64 kbps (1 channel) 128 kbps (2 channels)	\$35/mo. \$10 set up; \$250 modem	Very Limited
ADSL / DSL (telephone lines)	**512 kbps 1544 kbps (T-1 equiv.)	\$39.99/month (inc. Earthlink) \$59.99/month (inc. Earthlink)	Future Plans - Now Very Limited
Cable Modem	**1500 kbps	Cable Subscriber-\$39.95/mo.; Non-Cable Subs.-\$44.95/mo.; Modem Rental-\$5/mo; Modem Purchase-\$105 est.	***Very Limited
Satellite	**DIRECWAY: Two way system; 400 kbps downstream/150-200 kbps upstream; 27" x 32" dish	DIRECWAY – (1) 12-Month Plan: Install & equip.- \$99.99 down & \$99.99/mo., then \$59.95/mo. (2) Direct Purchase: Install & equip.- \$579.98, \$59.99/mo.	Yes
	**StarBand: Two way sys.; 500- 700 kbps downstream & 50 - 100 kbps upstream, 24" x 36" dish	StarBand – (1) 12-Month Plan: \$199 equip., \$200-\$300 install, \$99/ mo.; then \$69/mo (2) Direct Purchase: \$499 equip., \$200-\$300 install, \$69/mo.	Yes
	**Satellite Skycasters (business solution)	Satellite Skycasters: \$100 - \$250/month plus equipment (equip. purchase or lease)	Yes (business)
Wireless Cable MMDS	WorldCom (prices depend on kbps-examples provided)	384 kbps @ 12 mos. @ \$199/mo. & \$1,000 install; 768 kbps @ \$399/mo. & \$1,000 install	****Yes
<p>*Actual speeds will vary based on the amount of traffic on the Internet, the content on a particular Website, or by the overall performance and configuration of the computer.</p> <p>**Meets FCC's definition of "high-speed."</p> <p>***Comcast Service Area in the KLA: Bannerman Road, in general, is Comcast's northern service area limit in that area of the County. However, it does provide service in the Chadwick Drive subdivision (through a line off of Bull Headley Road) and to Channel 40 (Attachment #2, #17 is the Killearn Lakes area).</p> <p>****Within 35 mile radius of WorldCom tower (near I-10 & N. Monroe/Thomasville Rd.)</p>			

Budget Discussion Item: Proposal for Digital Canopy Expansion to Killearn Lakes Area
July 23, 2002
Page 8

Prior Attempt to Provide Wireless High-Speed Internet in the Killearn Lakes Area

Neighborhood: One of the high-speed Internet service providers staff contacted for the survey regarding cost and availability options (Table 3) was Velocity Online. Velocity Online's web page had a "Wireless Survey" for potential customers to complete if they were interested in broadband wireless service and wanted to know if it was available in their area (Killearn Lakes was a neighborhood location the potential customer could select). Staff therefore contacted Velocity Online to determine if it did provide broadband services in the Killearn Lakes neighborhood area. Velocity Online advised it was a wireless network provider, with the majority of its business in the downtown Tallahassee area, and that it had been contacted by numerous Killearn Lakes residents who were interested in receiving broadband services. Velocity Online subsequently contacted the Killearn Lakes Homeowner Association (KLHA) and were advised that the KLHA would not allow Velocity Online to put up antennas for wireless Internet connection in either the front of a house or above a house's roof line. Velocity Online further advised that they are still trying to find ways to deliver wireless service to the area, including satellite options. The Killearn Lakes covenants and restrictions provide the following: "Exterior radio and television antenna installations must be approved in writing by the Architectural Control Committee." Staff subsequently contacted NCGI and were advised that they had not contacted the homeowners association and that NCGI's proposal had not been reviewed/approved by the Architectural Control Committee. Staff advised NCGI of an ISP's prior attempt to provide wireless access there and that it was unable to obtain approval through the homeowner's association.

FCC Rule Regarding Restriction in the Placement of Certain Antennas and Satellite

Dishes: Both satellite and wireless technology require line of sight from the source (satellite or tower mounted transmitter) to the receiver (satellite dish or antenna). In eastern North America, satellite service availability requires a southwest exposure. The dish antenna can be mounted on a roof, the side of a building, or on a pole if necessary to achieve the necessary angle. Some fixed wireless technology, including the proposed Motorola Canopy product, require near line of sight between transmitter and receiver. Both fixed wireless and satellite solutions require flexibility in placing the receiver (dish or antenna) to receive the best, uninterrupted service. This appears to have been a problem in the Killearn Lakes area due to its covenants and restrictions. FCC's rule regarding restrictions in the placement of certain antennas and satellite dishes (Attachment #5) applies to the following types of video antennas:

- (1) A "dish" antenna that is one meter (39.37") or less in diameter and is designed to receive direct broadcast satellite service, including direct-to-home satellite service, or to receive or transmit fixed wireless signals via satellite. *(NOTE: The satellite dish antenna sizes sited in Table 3 and the antenna size of the proposed Canopy product (11.75" x 3.4" x 3.4") appear to meet this criteria).*
- (2) An antenna that is one meter or less in diameter or diagonal measurement and is designed to receive video programming services via MMDS (wireless cable) or to receive or transmit fixed wireless signals other than via satellite.
- (3) An antenna that is designed to receive local television broadcast signals. Masts higher than 12 feet above the roofline may be subject to local permitting requirements.

In addition, antennas covered by the rule may be mounted on "masts" to reach the height needed

Budget Discussion Item: Proposal for Digital Canopy Expansion to Killearn Lakes Area
July 23, 2002
Page 9

to receive or transmit an acceptable quality signal (e.g. maintain line-of-sight contact with the transmitter or view the satellite). Masts higher than 12 feet above the roofline may be subject to local permitting requirements for safety purposes. Further, masts that extend beyond an exclusive use area may not be covered by this rule.

The rule prohibits restrictions that impair a person's ability to install, maintain, or use an antenna covered by the rule. The rule applies to state or local laws or regulations, including zoning, land-use or building regulations, private covenants, homeowners' association rules, condominium or cooperative association restrictions, lease restrictions, or similar restrictions on property within the exclusive use or control of the antenna user where the user has an ownership or leasehold interest in the property. A restriction impairs if it: (1) unreasonably delays or prevents use of; (2) unreasonably increases the cost of; or (3) precludes a person from receiving or transmitting an acceptable quality signal from an antenna covered under the rule. The rule does not prohibit legitimate safety restrictions or restrictions designed to preserve designated or eligible historic or prehistoric properties, provided the restriction is no more burdensome than necessary to accomplish the safety or preservation purpose.

DSL in the Killearn Lakes Area: Staff spoke with Sprint representatives regarding plans they may have to expand DSL service into the Killearn Lakes area. Staff was advised that Sprint continues with its plans to expand DSL service there, with local ISP partners. A substantial portion of the Killearn and Killearn Lakes/Golden Eagle build out is slated to be completed by the end of the 2002 calendar year, continuing throughout 2003 (Attachment #6).

Cost Comparison with Other High Speed Technologies: The proposed wireless project, based on cost estimates provided by NCGI, would cost \$617.30 for a subscriber unit plus \$450 per subscriber installation (\$1,067.30 per household to purchase and install the home-based unit). This does not include the cost for the tower equipment, broadband, and customer support. Depending upon the cost subscribers would pay the County, to at least recover the costs associated with the high-speed network and services, the proposed wireless option would likely be more expensive than DSL (approximately \$40 to \$60/month if Sprint were able to extend services there), and may be competitive with satellite options (see Table 3).

Pilot Project Area: A two-mile range from two towers staff identified in the area appears to cover a vast majority of the Killearn Lakes area (Attachment 3) as well as a portion of Comcast's franchise area (Tower #64 is owned by WTWC Channel 40, and tower # 6 is sited on property owned by Frederick F. Searcy). If the pilot project is pursued, staff recommends that customers in the Comcast service not be eligible for participation, as they currently have the opportunity for high-speed access through Comcast, and that the pilot project area include only the Killearn Lakes neighborhood.

Budget Discussion Item: Proposal for Digital Canopy Expansion to Killearn Lakes Area
July 23, 2002
Page 10

Phased-In Project Alternative: Should the Board decide it would like to financially participate in a pilot project to expand wireless high-speed Internet access into the Killearn Lakes neighborhood, based upon issues identified in the analysis of the subject proposal staff recommends a phased-in approach that may include the following steps:

1. Killearn Homeowners' Association & Architectural Control Committee Support – Limit the pilot project to this one neighborhood and seek the approval and support of the homeowners' association and architectural control committee (as it appears to be necessary, based upon the neighborhood's covenants and restrictions, and perhaps in conflict with FCC's rule). Approval has not yet been sought/obtained and this issue appears to have blocked an ISP's prior attempt to expand such services there.
2. Market Study – Seek contractual services to determine whether there is an adequate customer base willing to pay the costs associated with wireless high-speed Internet access (as Satellite technology is available in the area and, if Sprint were successful in expanding service there, the customer base may decrease).
3. Assess Potential Liability.

Based on the outcome of the steps 1 - 3, seek Board guidance and approval prior to conducting signal strength testing.

4. Signal Strength Coverage – Without undergoing the cost of procuring additional Broadband to the central collection point, map signal strength in various areas of the Killearn Lakes neighborhood to determine feasibility (Attachment #4) (due to extent of tree coverage in the area).
5. Assess Security Issues.

Based on the outcome of steps 4-5, seek further Board guidance. Further steps may include the Design for Performance Measurement in the Pilot Project (test customer criteria; acceptable test outcomes; etc.); Customer Service Plan; and Refinement of Pilot Project Costs and Contract.

Budget Discussion Item: Proposal for Digital Canopy Expansion to Killearn Lakes Area
July 23, 2002
Page 11

Summary:

NCGI/Mainline's proposal is for a fixed-wireless pilot project in the Killearn Lakes area, as high-speed Internet access is not widely available in that area over cable-modems (Time-Warner) or DSL (telephone lines) at the current time. The total cost of the pilot project is estimated at \$106,350, including a \$48,000 contract with NCGI. The \$48,000 contract includes the cost for purchasing five home-based units (@ \$617.30 each) and installation of those units (@ \$450 each) for a per household cost of \$1,067.30 (excluding the cost of the network etc.). If the Board determines it wants to financially support the wireless pilot project, staff has provided a phased-in alternative approach for the Board's consideration.

High-speed Internet access is available in the Killearn Lakes area via satellite, and Sprint plans to expand DSL service there with substantial completion projected for the end of this calendar year continuing through 2003. A local ISP has previously attempted to provide a fixed wireless solution in Killearn Lakes and could not obtain approval by the Killearn Lakes Homeowner's Association.

OPTIONS:

1. Do not conduct a pilot project to expand wireless high-speed Internet services in the Killearn Lakes area and direct staff to update the Board on Sprint's and other entities' efforts to expand DSL services there.
2. Direct staff to prepare an agenda item for the Board's consideration of a phased-in approach for a pilot project to expand wireless high-speed Internet services in the Killearn Lakes area.
3. Direct staff to prepare an agenda item for the Board's consideration of a contract with NCGI/Mainline to conduct the proposed pilot study.
4. Board direction.

RECOMMENDATION:

Option 1.

Attachments:

- #1 – Proposal to Expand High-Speed Internet Service into the Killearn Lakes Area
- #2 – Comcast Service Area (in this section of the County)
- #3 – Towers (in this section of the County)
- #4 – Signal Strength Testing
- #5 – FCC Fact Sheet, Over-the-Air Reception Devices Rule
- #6 – E-Mail from Sprint re: DSL Planned Expansion in the Killearn Lakes Area